1,111,999

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Dispensing Valve for Pressurised Atomisers

We, NEWMAN-GREEN VENTIL GMBH, a German Body Corporate of Chilehaus C, Hamburg 1, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The modern packaging industry makes use of pressurised atomisers for spraying certain media such as paints or varnishes, hair sprays, pharmaceutical agents and the like, *i.e.*, media which are packed in bottles or cans and have a liquid consistency. This type of packing is prepared as follows:

A bottle or can is filled with the medium for spraying and is pressurised with a gas known as a propellant gas. A valve which is actuated by being pressed or tilted is provided on the container for spraying of the contents. The gas expels the medium from the can via a riser which extends as far as the base of the container.

The disadvantage of this method, particularly as regards pharmaceutics, is that the quantities dispensed are not accurate. Thus if the spray head is depressed and held down the bottle or can will continue to discharge continuously and thus give an excessive dose of the medium.

Various valves intended to dispense only an accurate quantity have therefore been developed. The valve is formed appropriately and so provided with plastics or rubber intermediate valves as to form a collector chamber above the riser. The quantities dispensed with prior art valves, however, are inaccurate because of the provision of such "floating" seals, and the resultant spray patterns are inaccurate since the openings from the riser to the dispensing chamber are not fixed, and in particular, the various shaped or positive seals swell. A disadvantage of this is that when the containers are, for example, half-emptied, jamming occurs since the gas pressure is reduced.

All the known valves have the disadvantage that the pressure filling, *i.e.*, introduction of the propellant gas into the container, is a difficult matter. The propellant gas can enter the bottle or container only *via* the tiny bores which determine the spray pattern and spraying speed, so that filling is a very long process. However, it is precisely the filling which is a considerable cost factor. Very short times are required to avoid making the product excessively expensive.

Another disadvantage of the prior art dispensing valves is that it is impossible to vary the spray intensity, since the latter is determined by the valve and its passages in the container.

The object of the invention is to provide a new dispensing valve to obviate all the disadvantages of the prior art valves by means of a new and reliable construction.

According to the invention, there is provided a dispensing valve for pressurised atomisers, having a dispensing chamber which is connected to the container interior *via* closable apertures and which chamber on actuation of the valve by a detachable spray head comes into communication with a spraying aperture in the head, said spray head being replaceable by a filler head for charging said container with propellant gas, the apertures connecting the dispensing chamber to the interior of the container being closed on operation of said filler head, and a closure element enclosing the dispensing chamber and normally sealing the dispensing chamber from a wide passage surrounding said closure element also being moved on operation of said filler head to open said wide passage which then comes into communication with the filler head and directs propellant gas therefrom to said container.

The dispensing valve according to the invention has the following advantages over known valves:

1. Exact location of the dispensing chamber with the elimination of all seals of special form by parts of fixed dimensions.

[*Price 4s. 6d.*]

2. The valve is so designed that a different path is used for filling the container from that used for ejection. The propellant gas is introduced directly into the valve by the filler, *i.e.*, *via* the aperture which is otherwise occupied by the spray head. Depression of the filler opens two opposed cylinders in the valve, which release a large cross-section for the entry of the gas. In these conditions a very high filling speed is obtained of as much as 10 times that of prior art valves.

3. The spray head, which is depressed by means of the finger for spraying purposes, can be removed from the container after filling and be changed for a spray head of a different construction or with a different bore. Thus, after the container has been filled the spray pattern and spraying speed can be altered as required.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 shows the valve according to the invention filled in the inoperative position;

Fig. 2 shows the same with the spray head depressed in the spraying position, and

Fig. 3 shows the spray head removed and a filler attached for filling.

The dispensing valve consists of a riser holder 1 which may for example be made from plastics or metal, a cylinder 2 formed with a bore 3 and a chamber 4 containing a sealing washer 5 and a spring retainer 6. The chamber 4 contains a cylindrical plunger 7 having a widened portion 8 formed with a bore 9 to receive the spray head 10. The cylinder 2 and the widened portion 8 press against a gasket 11 at 12. The head 10 has a fine bore 13. A spring 14 is disposed in the riser holder 1 and acts on the cylinder 2, while a smaller spring 15 is also disposed in the cylinder 2 to press the plunger 7 against the gasket 11 by the widened portion 8. The bottom of the cylinder 2 is formed with recesses 16 through which the gas and medium can flow.

The bottom of the plunger 7 is formed with a slot-like recess 17 *via* which the product enters the dispensing chamber.

Secured to the container (not shown), the valve is sealed by a cap 18 and a gasket 19.

The product which it is required to spray rises from the container *via* a riser 20 fixed in the holder 1 and flows to the valve, or, conversely during filling with propellant gas, through the riser into the container.

The subject of the invention is operated as follows: Fig. 1 shows the valve, for example after it has been secured to and sealed on a container, in the inoperative position. The medium propelled by the gas flows through the riser into the bore 3 and *via* the slot 17 into the chamber 4, where it remains. The chamber 4 contains the quantity for dispensing, such a quantity being determined by the size of the chamber.

As soon as the head 10 is depressed as far as the stop 22, as shown in Fig. 2, the aperture 13 of the stem 23 enters the chamber 4. The product is forced through the bore 13 into the head passage 24 and is sprayed. The plunger 7 has sealed off the access of the container contents to the chamber, the slot 17 having passed the gasket 5. Only the quantity contained in the chamber 4 can be ejected.

The bore 13 governs the speed and intensity of spraying while the passage 24 and the opening 25 govern the spraying pattern. Once the gead 10 is released the plunger 7 returns against the gasket 11 and seals the container off from the exterior as a result of the pressure of the spring 15. The slot 17 of the plunger 7 is in a position above the seal 5 and new product can enter the dispensing chamber 4 *via* the riser 20. This restores the initial state. The aperture 13 in the spray head 10 has again passed out through the gasket 11 and thus no longer communicates with the chamber 4.

As is shown in Fig. 3, the container is filled by introduction of the filler projection 27 of a filler head 26 through the gasket 11 into the widened part 8 of the plunger 7. The spray head 10 has been removed beforehand. The cylindrical outer wall of the projection 27 is sealed by the gasket 11 at 28. The projection compresses the spring 15 and at maximum compression the projection is pushed down further until the cylinder 2 bears against the spring 14 as far as the stop 29 — *i.e.*, the base of the riser holder 1. The projection 27 is formed with bores 30 through which the propellant gas can flow *via* the valve into the container. The gas can flow out of the projection at full cross-section since the cylinder 2 has completely freed the cavity 21. The gas flows *via* the recesses 16 and riser 20 into the bottle or container which it is required to fill. To expedite matters the cylinder 2 has star-shaped recesses 31. The spring 14 bears against these recesses or ribs. At the same time, they act at 31 as guidance for the cylinder against the inner wall of the riser holder 1 on the one hand, while on the other hand in both cases guidance in the gasket 11 is provided by the projection 27 or the spray head 10.

Fig. 3 clearly shows that the filling with propellant gas is not carried out, for example, *via* the spray aperture 13, but *via* a cylindrical valve seat 32 on the cylinder 2. When the filler head 26 is removed, a spray head 10, which for example may be constructed for different spray patterns, can be fitted through the gasket 11 into the bore 9 of the plunger 7 without any emptying or modification of the valve being necessary.

All the parts are so constructed that they behave in exact mechanical relationship, thus avoiding any changes in the dispensed volume. Jamming is also impossible since only plain seals are used.

WHAT WE CLAIM IS:—

1. A dispensing valve for pressurised atomisers, having a dispensing chamber which is connected to the container interior *via* closable apertures and which chamber on actuation of the valve by a detachable spray head comes into communication with a spraying aperture in the head, said spray head being replaceable by a filler head for charging said container with propellant gas, the apertures connecting the dispensing chamber to the interior of the container being closed on operation of said filler head, and a closure element enclosing the dispensing chamber and normally sealing the dispensing chamber from a wide passage surrounding said closure element also being moved on operation of said filler head to open said wide passsage which then comes into communication with the filler head and directs propellant gas therefrom to said container.

2. A dispensing valve according to Claim 1, characterised in that the said closure element is in the form of a hollow piston which accommodates a second closure element.

3. A dispensing valve according to Claim 2, characterised in that the two closure elements extend coaxially and both bear against a flat gasket at their top end faces under spring pressure.

4. A dispensing valve according to Claim 3, characterised in that the flat gasket also forms the means of sealing the valve casing from the atmosphere and is fixed by the riser holder of the valve and a valve cap.

5. A dispensing valve according to Claims 3 or 4, characterised in that two springs act on the flat gasket, one spring acting on the first-mentioned closure element being arranged for filling and the other spring acting on the second closure element for spraying.

6. A dispensing valve according to any one of Claims 2 to 5, characterised in that in the inoperative position of the valve the second closure element seals the dispensing chamber from the atmosphere while on the other hand when the valve is actuated the second closure element closes said chamber from the interior of the valve casing surrounding said chamber and in the inoperative position of the valve opens a passage from the container interior to the dispensing chamber and on actuation of the valve opens the dispensing chamber to the atmosphere for ejection of the product.

7. A dispensing valve according to any one of Claims 2 to 6, characterised in that for actuating the valve for dispensing the second closure element is axially movable against spring action and carries the removable spray head.

8. A dispensing valve according to Claim 7, characterised in that the apertures for refilling the dispensing chamber are provided in the second closure element which element acts in the manner of a slide valve.

9. A dispensing valve according to Claim 7 or 8, characterised in that the spray head is provided with a neck attachment formed with an axial bore which leads to the spray aperture and which on depression of the spray head communicates with the dispensing chamber *via* a transverse bore.

10. A dispensing valve according to claim 8 or 9, characterised in that the spray head with the aperture therein is interchangeable independently of the other valve parts in order to obtain a different spray intensity and/or spray pattern.

11. A dispensing valve for pressurised atomisers, constructed and arranged substantially as described herein with reference to and as shown in the accompanying drawings.

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3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

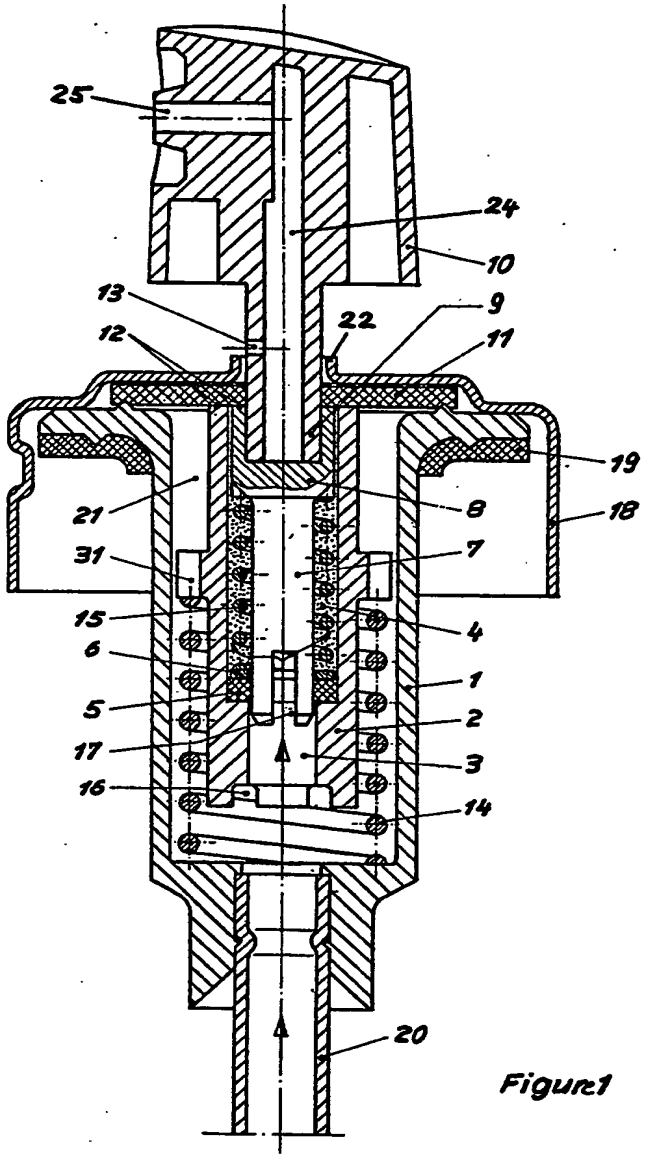

Figure1

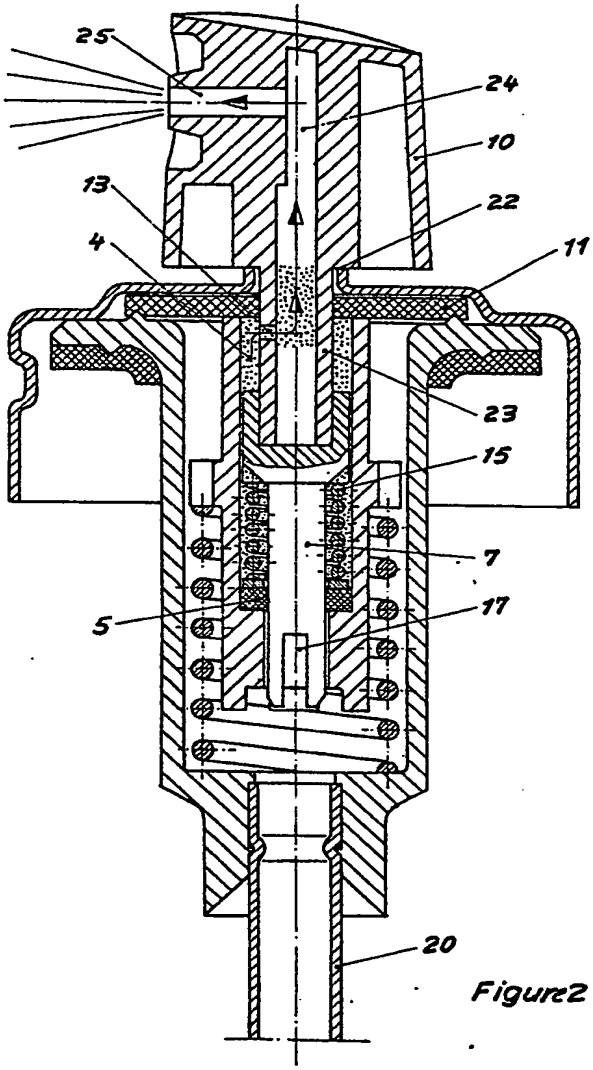

Figure2

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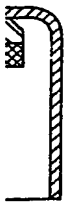
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 2 & 3



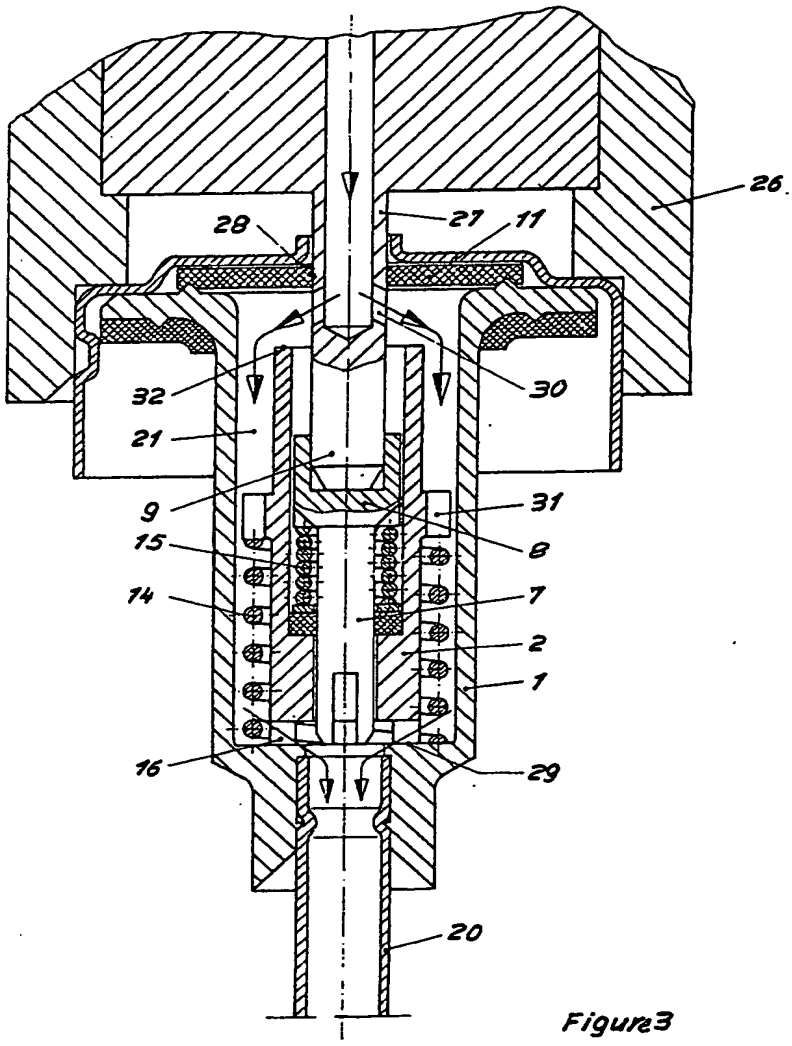


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Figure3

1111999 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 2 & 3

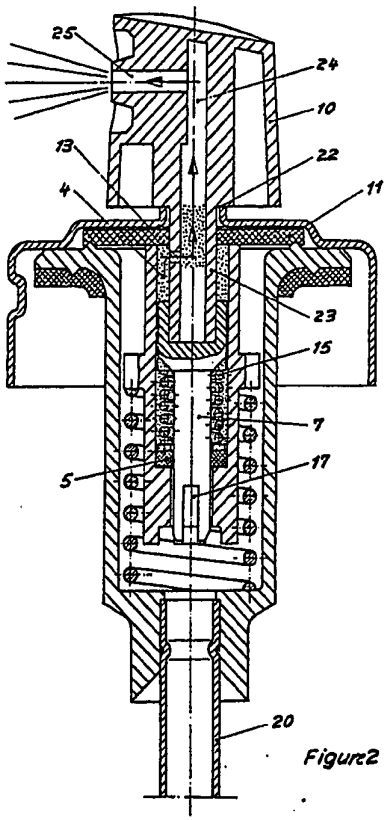

Figure2

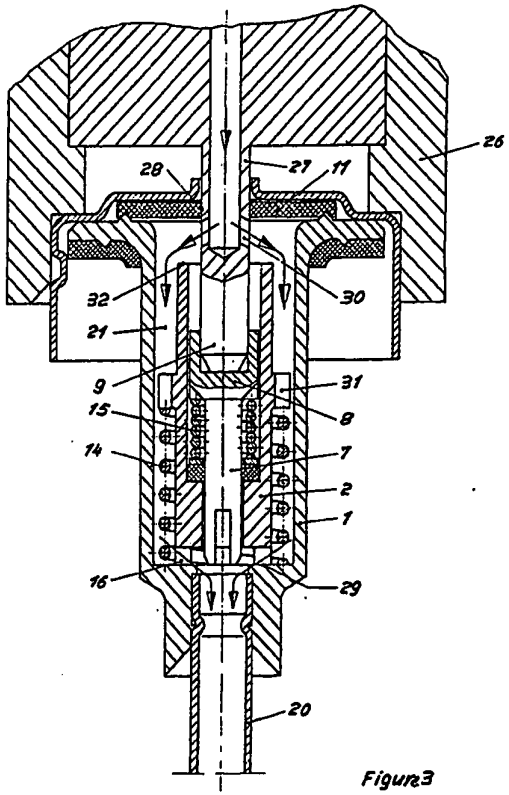

Figure3

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